FLUKE

Instruction Sheet

80PK-6A

Type K Exposed Junction Probe

WARNING

TO AVOID ELECTRICAL SHOCK, DO NOT USE THIS PROBE WHEN VOLTAGES EXCEEDING 24V AC RMS OR 60V DC ARE PRESENT. THE PROBE TIP IS ELECTRICALLY CONNECTED TO THE OUTPUT TERMINALS.

INTRODUCTION

The 80PK-6A Type K Exposed Junction Probe is essentially a bead probe with a handle that can be used as a surface probe. The stainless steel sheath allows the bead to measure temperatures higher than bead probes with flexible leads. The handle also allows you to apply more focused surface pressure without having your hand in close proximity to the source. The 4-foot cable is terminated with a Type K miniature thermocouple connector with 0.792-mm (.312-in) pin spacing. The 80PK-6A can be used with any temperature-measuring instrument that is designed to accept Type K thermocouples and has a miniature connector input.

SPECIFICATIONS

Type: K Standard Grade Ni-Cr vs Ni-Al (Chromel vs Alumel)

Measurement Range: -196°C to 816°C (-320°F to 1500°F)

Accuracy (With respect to ANSI MC96.1-1982 - Standard Limits of Error):

NOTE

All error calculations should be done in °C, then scaled to °F.

RANGE	ACCURACY (% of reading)
-196°C to -110°C (-320°F to -166°F)	±4% (°C)
-110°C to -40°C (-166°F to -40°F)	±4.4°C
-40°C to 275°C (-40°F to 527°F)	±2.2°C
275°C to 816°C (527°F to 1500°F)	±0.75% (°C)

Output: @ 25° C (77° F) = 1.00 mV (reference junction @ 0° C)

Seebeck Coefficient: 25° C (77° F) = 40.50 μV/° C

Measurement Time (Time Constant): 3.0 seconds for air moving at 3.33 meters/second (10.9 feet/second) at sea level pressure (5 time constants = 1 complete step change, i.e., 15 seconds)

Maximum Voltage: 24V ac rms or 60V dc

Maximum Temperature of Tip: 816° C (1500° F)

Sheath
- Material: 304 Stainless Steel
- Dimensions
  - Diameter: 4.8 mm (.19 in)
  - Length: 20.32 cm (8 in)

Bead (sensor) Sheath
- Material: Inconel 600
- Dimensions
  - Diameter: 1.0 mm (.04 in)
  - Length: 6.35 mm (.25 in)

Grounding: Junction Welded to Sheath

Cable
- Length: 1.2 meters (4 ft)
- Insulation
  - Material: PVC
  - Maximum Temperature: 105° C (220° F)
  - Jacket Color: Gray

Conductors
- Type: K
  - Size: AWG #24 stranded (7 strands of #32)

Handle
- Material: Gray Hytrel
- Maximum Temperature: 125° C (257° F)

Connector
- Type: Mini-thermocouple connector with .792 mm (0.312 in) pin spacing
- Material: Yellow Hytrel
- Maximum Temperature: 125° C (257° F)

Overall Length: 31.9 cm (12.55 in) from tip to end of cable strain relief.

Protection: Class 3. Relates solely to insulation and grounding properties defined in IEC 348.

MEASUREMENT CONSIDERATIONS

Instrument Compatibility

The 80PK-6A is compatible with any temperature-measuring instrument that accepts Type K thermocouples, has a miniature thermocouple connector, and has cold reference junction compensation. Accuracy of the temperature-measuring instrument must be considered along with the 80PK-6A accuracy specification to determine the overall accuracy of the combination.

Temperature Limitations

The tip area (thermocouple-sheath) of the 80PK-6A has a continuous temperature rating of 816° C (1500° F). However, the opposite end of the sheath nearest the

handle should not be subjected to temperatures greater than 125° C (257° F). This is the maximum temperature limitation of the handle.

Media Limitations

The stainless steel sheath should not be exposed to halides or sulfides. Even though the sheath to junction transition is sealed, it is not recommended to immerse the probe in liquid or saturated vapor. The 80PK-6A should not be used in reducing atmospheres or in a vacuum. Excess mounting force can deform or crush the bead. With the probe perpendicular to the measurement surface, do not apply more than 12.25 newtons (2.75 pounds-force). Use proportionately less force as the angle to the measurement surface becomes more acute.

OPERATION

Use the 80PK-6A as follows:

1. Using the miniature (0.312-inch spacing) thermocouple, connect the 80PK-6A to a compatible Type K temperature-measuring instrument.

2. Turn on the measuring instrument, and select the appropriate range and scale.

3. Check the readout on the measuring instrument. With no heat or cold source applied to the bead, the measuring instrument should display the ambient (room) temperature. If the instrument does not read out properly, refer to the TROUBLESHOOTING paragraphs that follow.

MINIMIZING THERMAL SHUNTING

The 80PK-6A Exposed Junction Probe should be inserted at least 6.35 cm (2.5 in) into the environment to be measured to minimize the shunting effect of the sheath.

MEASURING TECHNIQUE

Here are some suggestions for improving the accuracy of your temperature measurements:

1. Make sure there is a good connection between the probe and the surface you are measuring by doing any of the following:

   a. Increase the mounting pressure.

   b. Use an interface agent (such as silicone grease) between the thermocouple probe and the surface you are measuring.

   c. Use a thermal epoxy to attach the thermocouple.

2. When measuring higher than ambient temperatures, adjust the connection between the probe and the surface until you get the highest temperature reading. To ensure a good connection, see the suggestions above.

3. When measuring lower than ambient temperatures, adjust the connection between the probe and the surface until you obtain the lowest temperature reading. To ensure a good connection, see the suggestions above.

4. When measuring near ambient temperatures, make the reading when the multimeter readout is most stable.

TROUBLESHOOTING

With no heat or cold applied to the probe, the measuring instrument should display the ambient temperature. If the measuring instrument does not read out properly, try the following:

1. Verify that the temperature-measuring instrument is designed to be used with Type K thermocouples. The temperature-measuring instrument should have a yellow input connector and/or be marked with a "K".

2. Check for an open circuit indicator on the measuring instrument. Some temperature-measuring instruments have a built-in circuit to indicate if the connected probe is open. (All Fluke temperature-measuring instruments have this feature.) Refer to the owner's manual accompanying the measuring instrument to see if this feature is available.

   Short the two input pins of the measuring instrument with a piece of wire. If the instrument is functioning, it should indicate the ambient temperature.

3. If you suspect a broken connection, use an ordinary ohmmeter to read the continuity of the measuring instrument from pin to pin. The ohmmeter should read 20 ohms or less if there is continuity.

SCALE CONVERSIONS

Use the following equation to convert °C to °F:

$$(°C \times 1.8) + 32 = °F$$

Use the following equation to convert °F to °C:

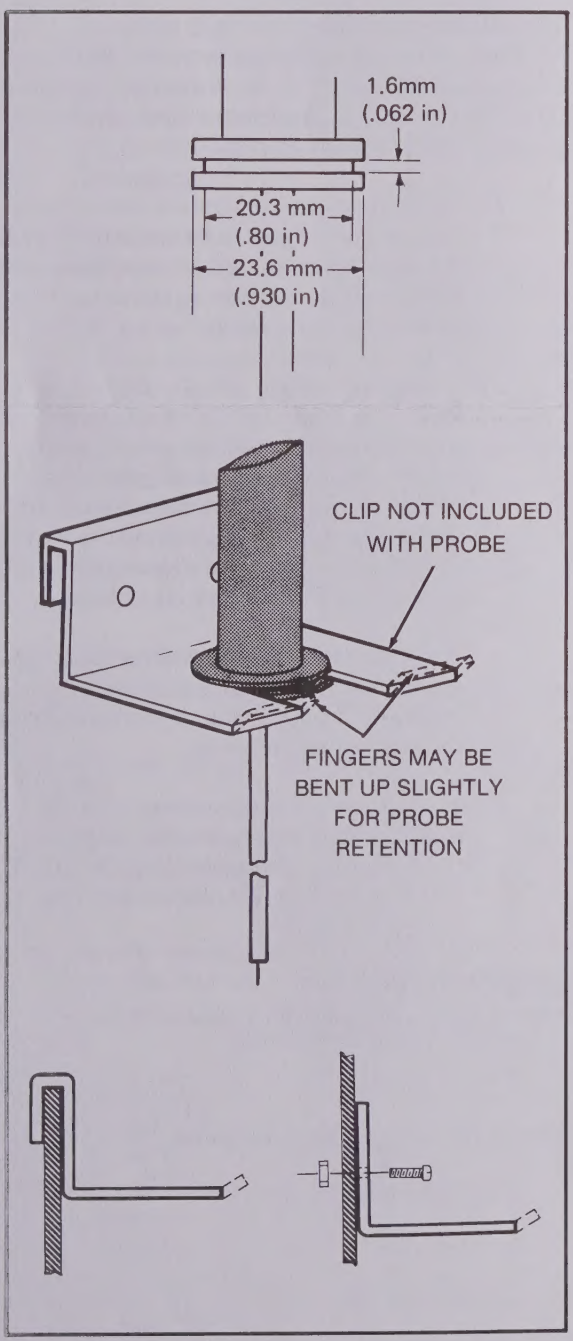
$$(°F - 32) \times 0.5556 = °C$$

PROBE MOUNTING GROOVE

The probe finger guard contains a groove to simplify mounting the probe in a fixed position. The figure below shows nominal dimensions for the finger guard and groove, and suggests a temporary quick mounting method. However, any mounting method should be carefully designed to prevent damage to the probe or the measured medium.

CAUTION

The handle and plug of the probe are made of materials that may deteriorate when exposed to some solvents on a long-term basis.



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